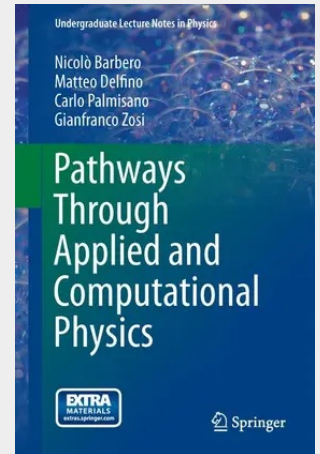


Pathways Through Applied and Computational Physics

This book is intended for undergraduates and young researchers who wish to understand the role that different branches of physics and mathematics play in the execution of actual experiments. The unique feature of the book is that all the subjects addressed are strictly interconnected within the context of the execution of a single experiment with very high accuracy, namely the redetermination of the Avogadro constant N_A , one of the fundamental physical constants. The authors illustrate how the basic laws of physics are applied to describe the behavior of the quantities involved in the measurement of N_A and explain the mathematical reasoning and computational tools that have been exploited. It is emphasized that all these quantities, although pertaining to a specific experiment, are of wide and general interest. The book is organized into chapters covering the interaction of electromagnetic radiation with single crystals, linear elasticity and anisotropy, propagation of thermal energy, anti-vibration mounting systems, and data analysis and B-spline interpolation. An essential feature is the focus on the role of Mathematica, an invaluable, fully integrated software environment for handling diverse scientific and technical computations.

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